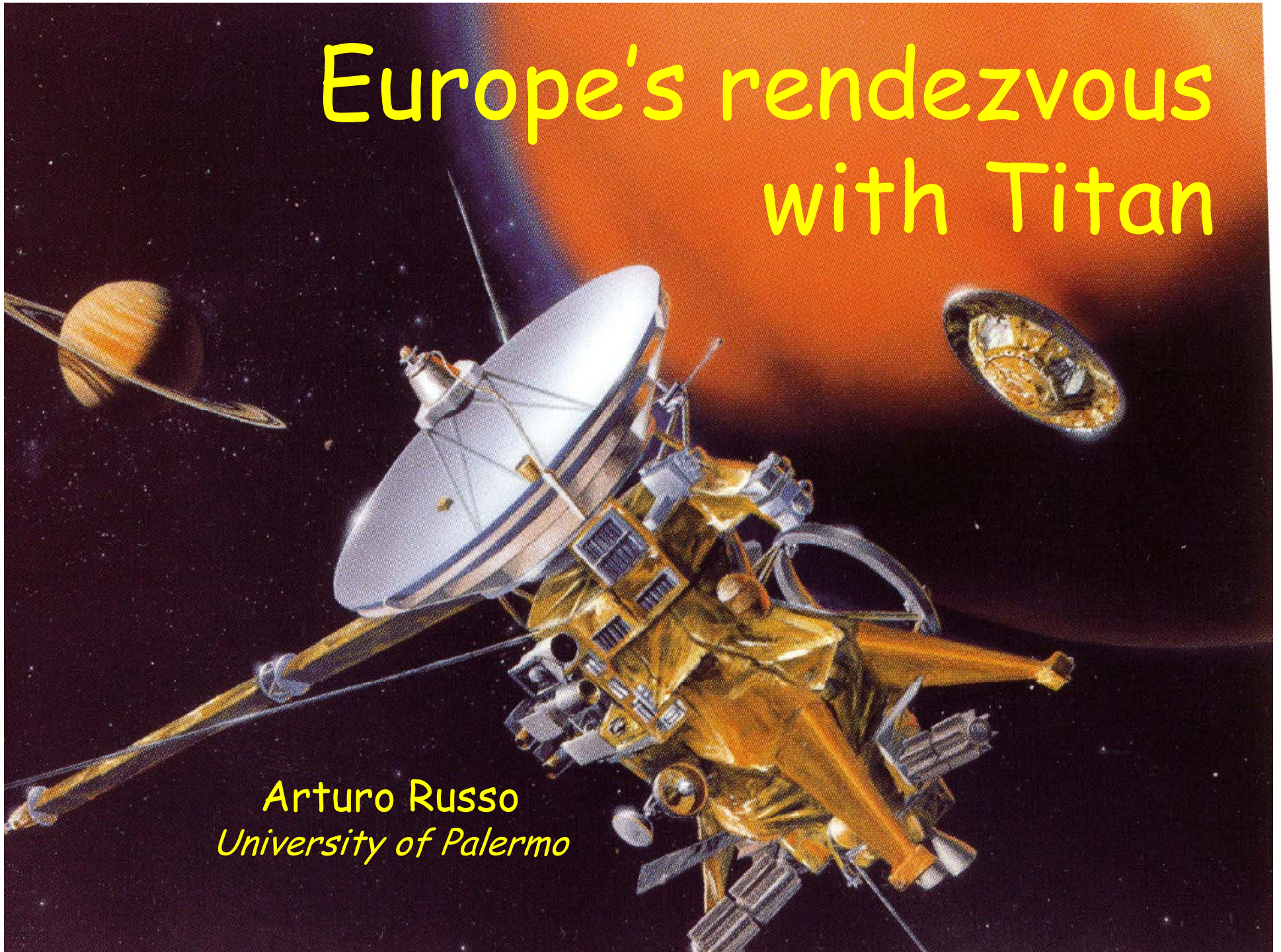
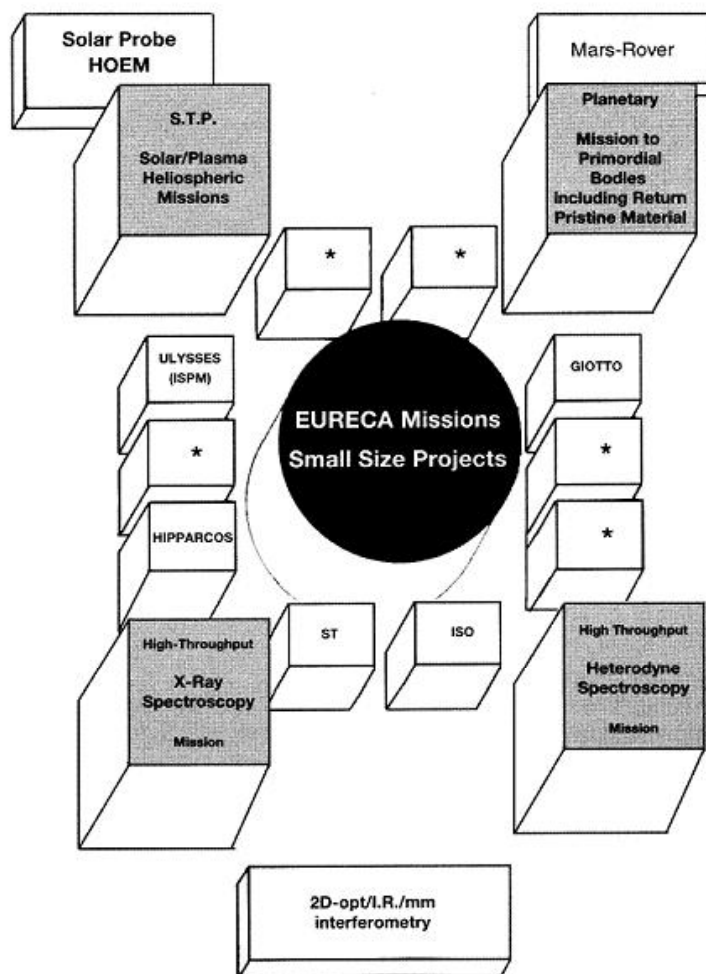


# Europe's rendezvous with Titan

Arturo Russo  
*University of Palermo*







# Horizon 2000





# Voyager 1

November 1980





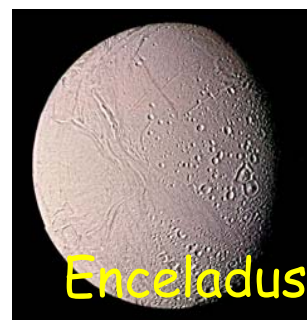
Titan



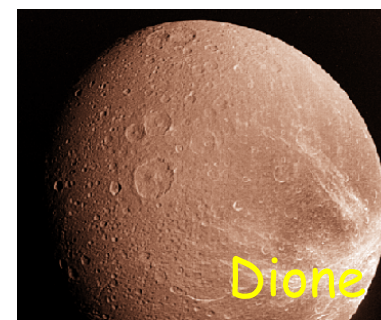
Rhea



Tethys

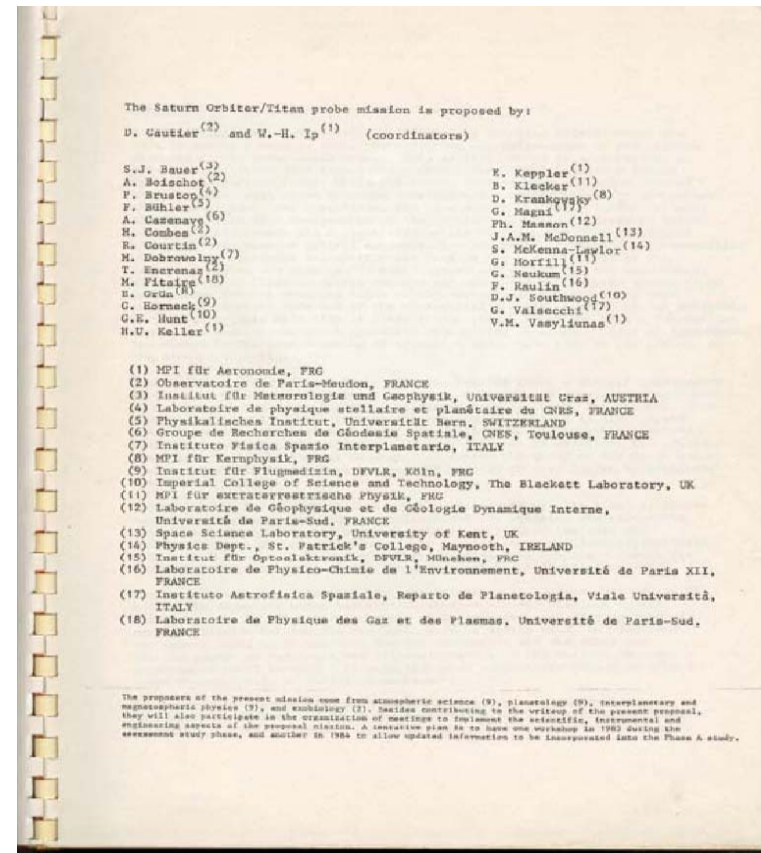
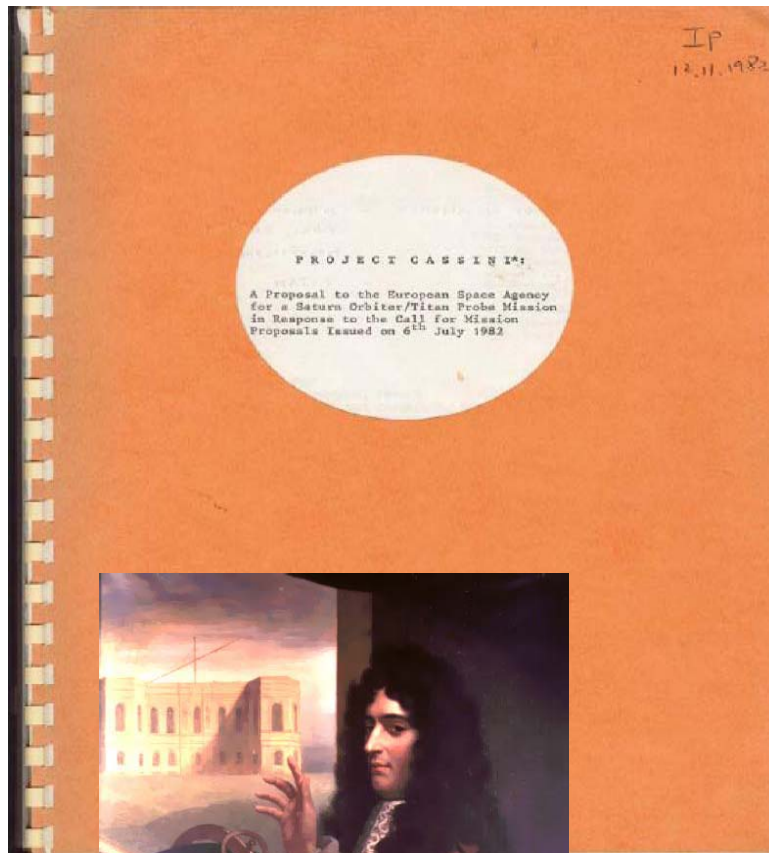


Enceladus



Dione





# Project Cassini

## November 1982

# Mission concept (1985)

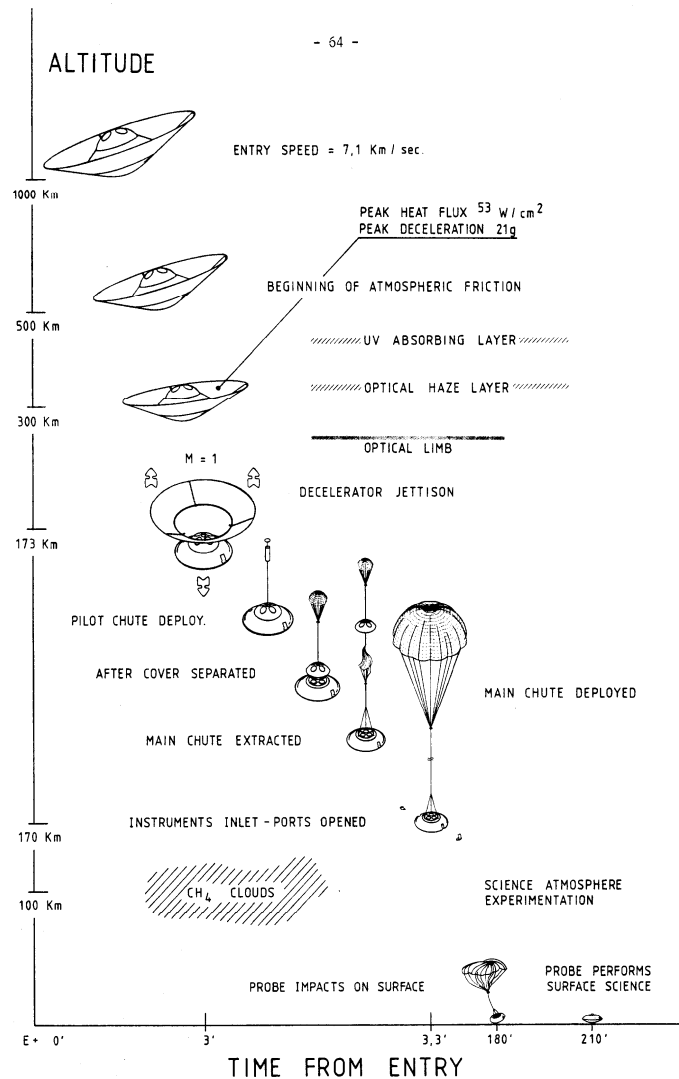
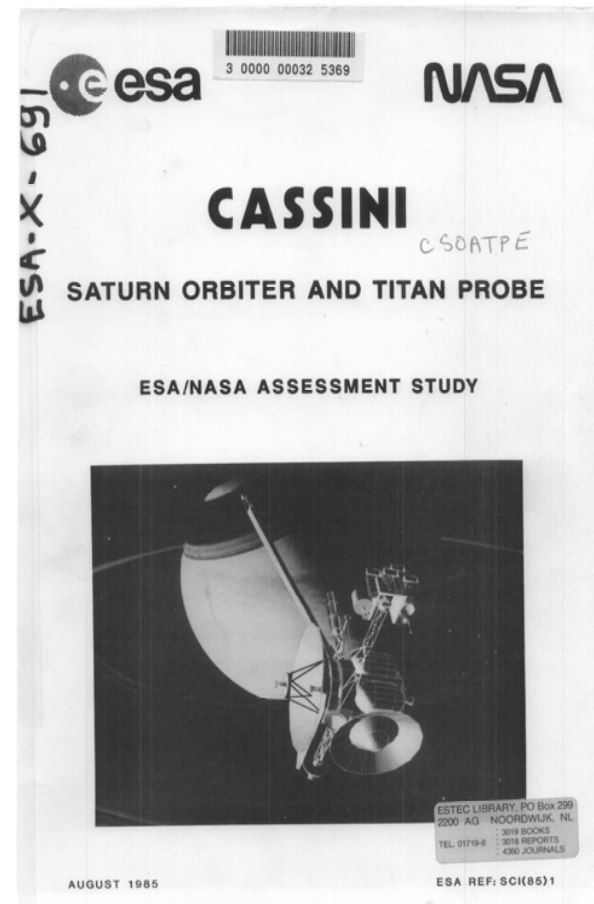


Figure 6.7 : Probe descent profile and scenario

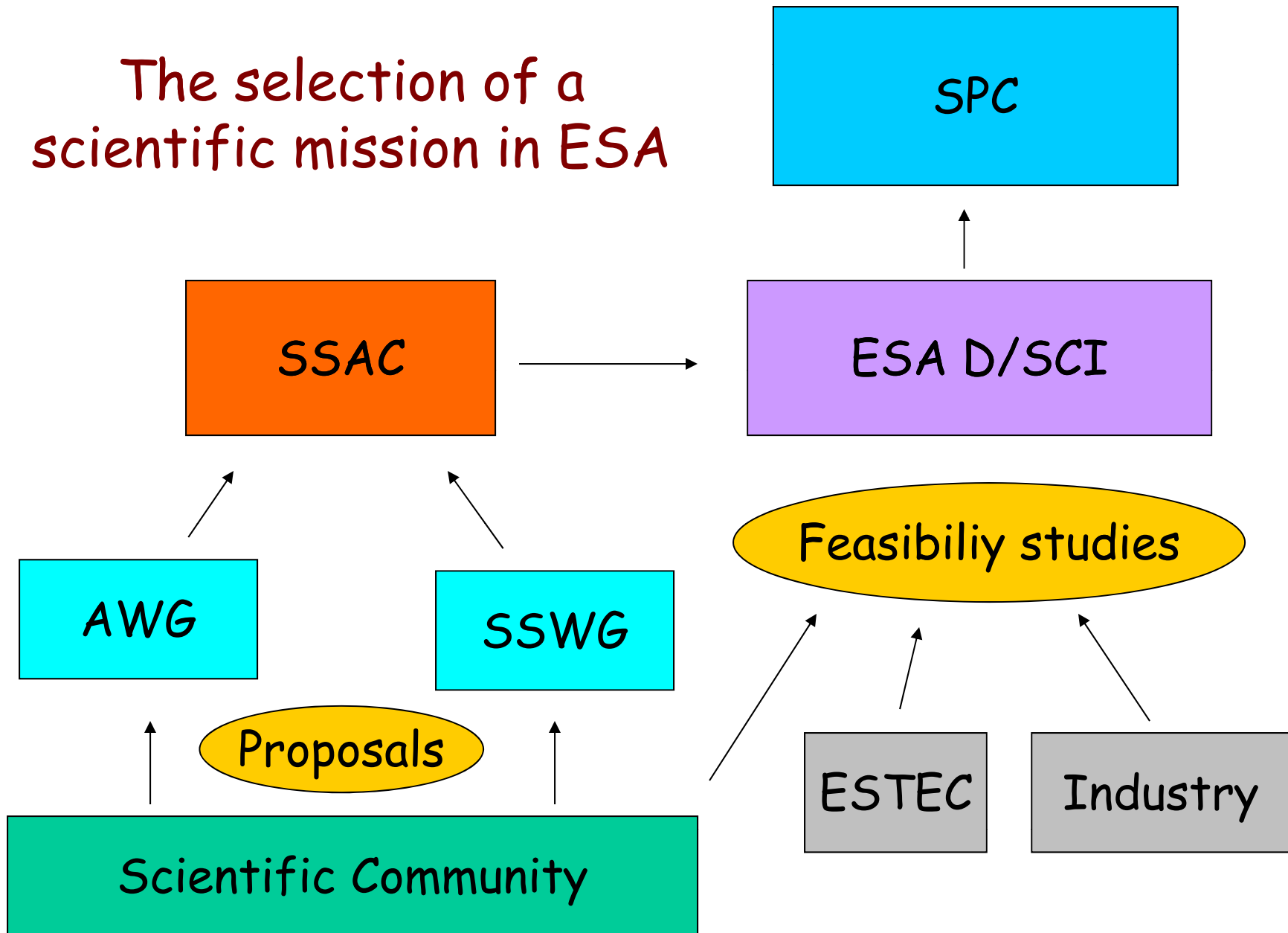


# The time of decision

(Bruges, 25-27 October 1988)

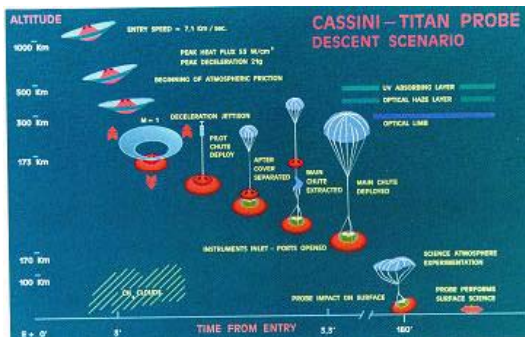
Cassini	Saturn and Titan
Vesta	Asteroids and comets
Quasat	Radio astronomy VLBI
Grasp	Gamma ray astronomy
Lyman	UV astronomy

# The selection of a scientific mission in ESA

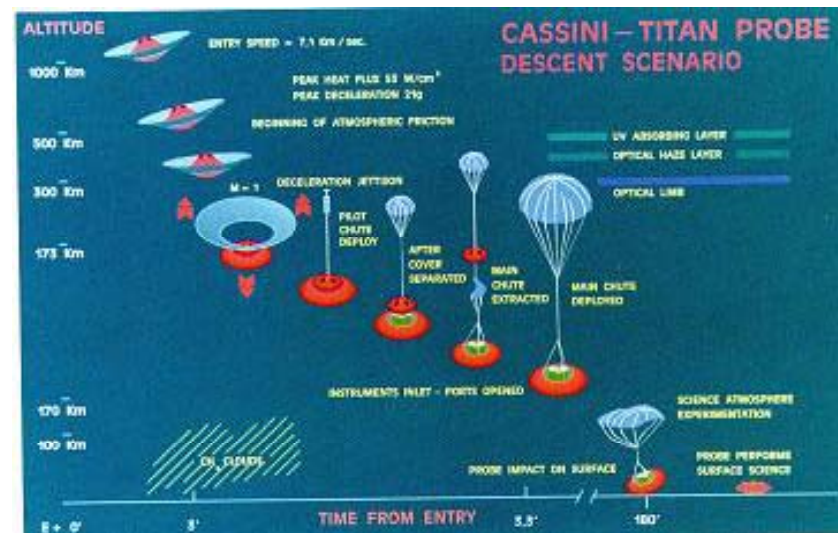


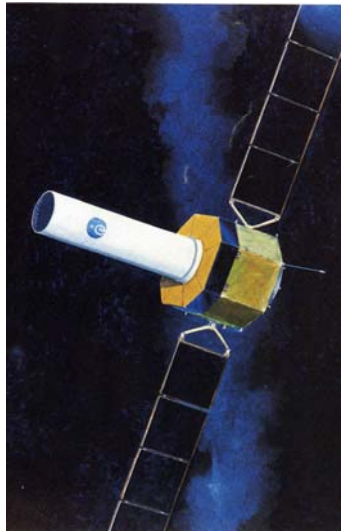


# The choice of the SSWG



Cassini / Titan probe



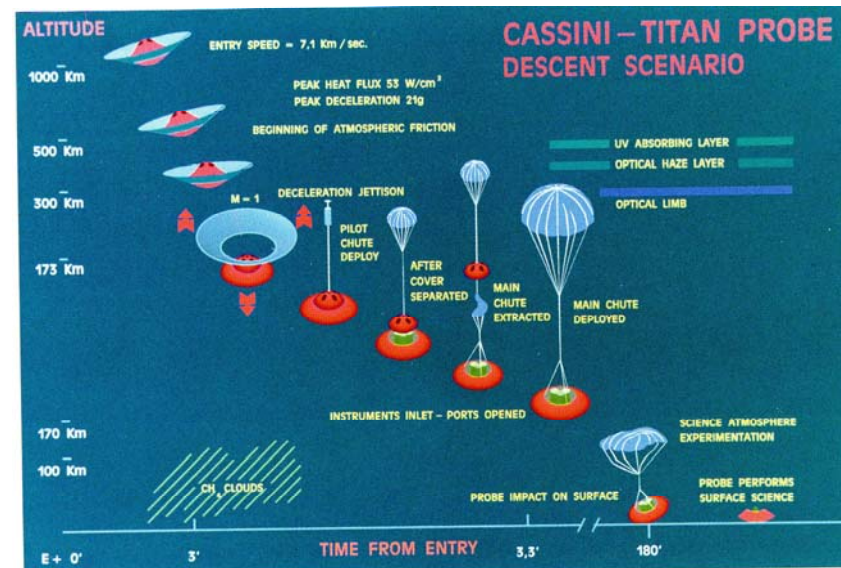


GRASP

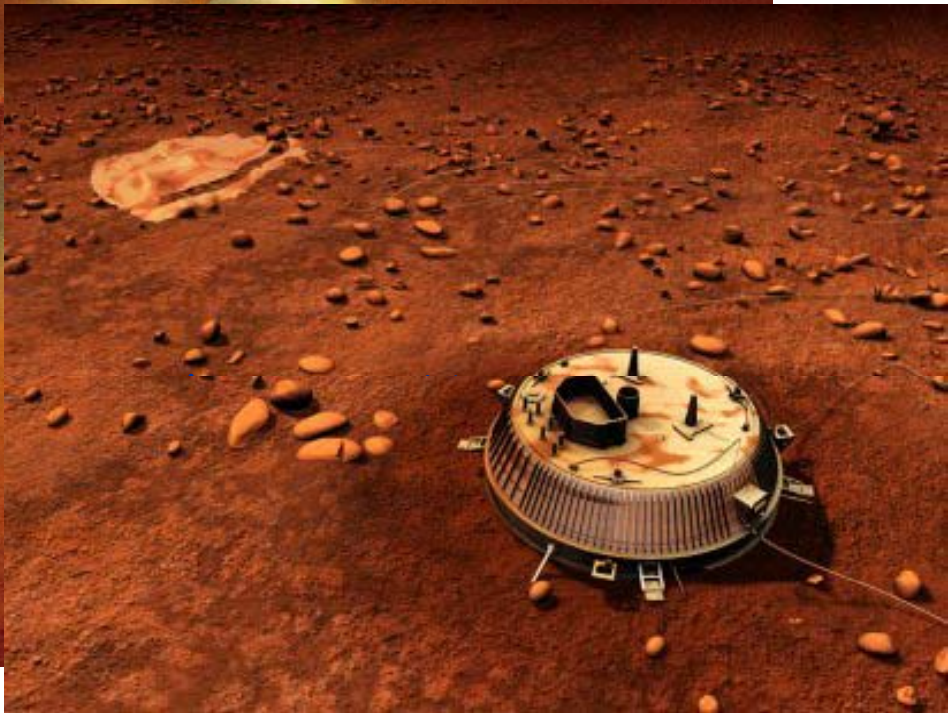
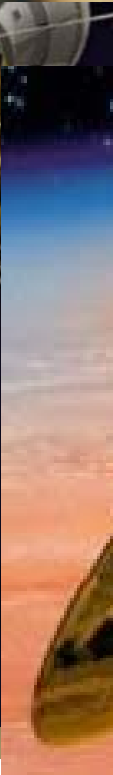
# The choice of the SSAC



Cassini / Titan probe



# The Huygens mission





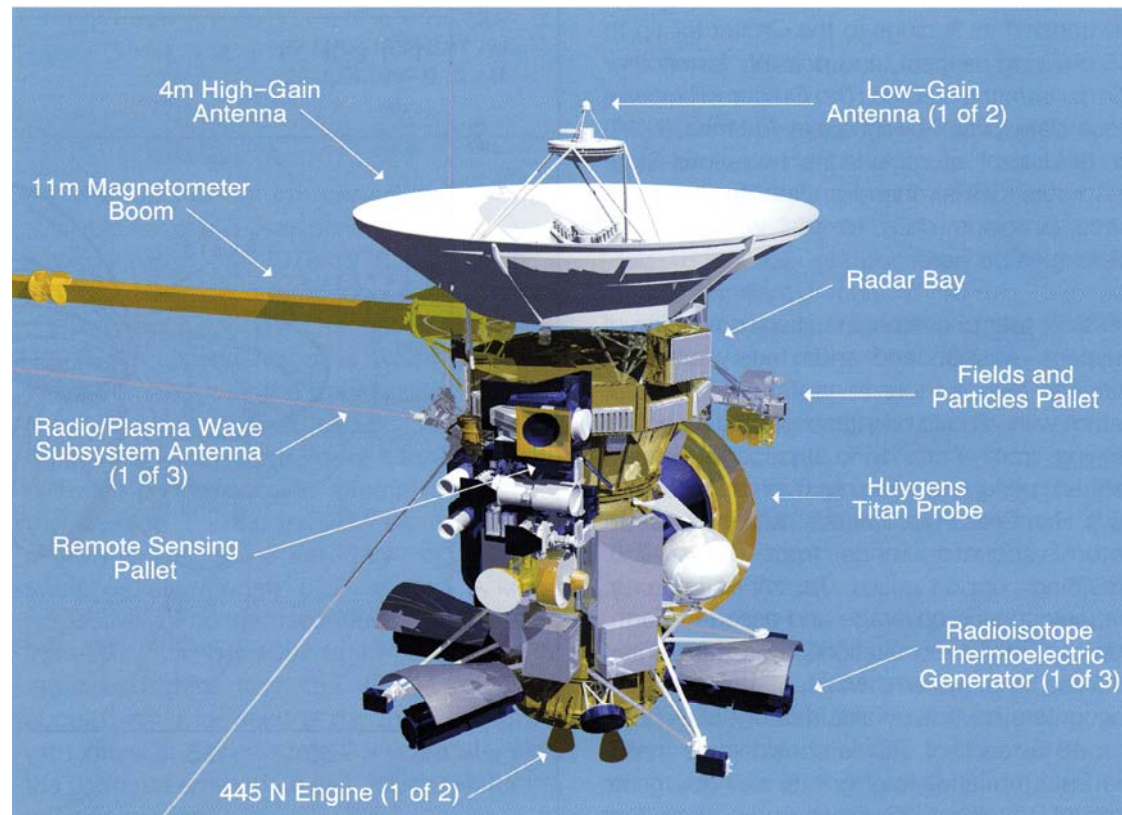
One year later in America ...



Mariner Mark II

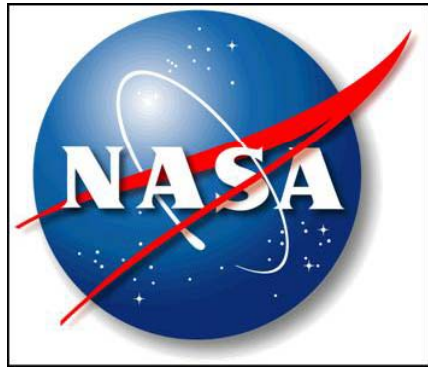
October 1989: Congress approval of the  
CRAF/Cassini program

# The Cassini spacecraft



Planned launch:  
November 1995

# ESA/NASA collaboration



Memorandum of Understanding  
(17 december 1990)



## Crisis in the United States (1991-92)

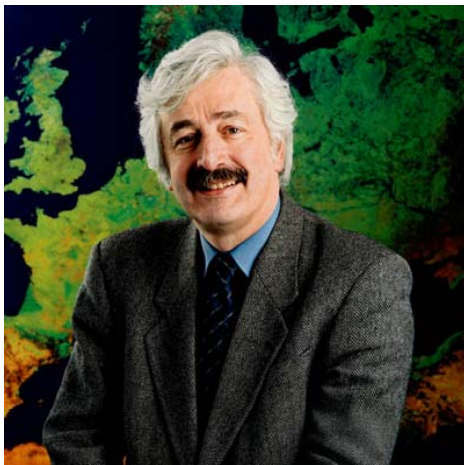


George Bush Sr.

Richard Truly



# Protests in Europe



D. Southwood  
(Chair SSAC)

“This is not in the spirit of the MOU!”



J.-M. Luton  
(ESA DG)

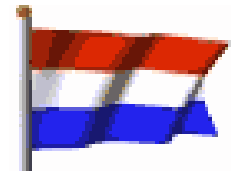
“An intolerable stress ... I cannot emphasize enough the change this can easily induce in the climate of cooperation”

# Protests in Europe



“Commiments [must] be honoured”

“It should be impressed upon NASA that international cooperation is a valid proposition only as long as the partners honoured their commitments”

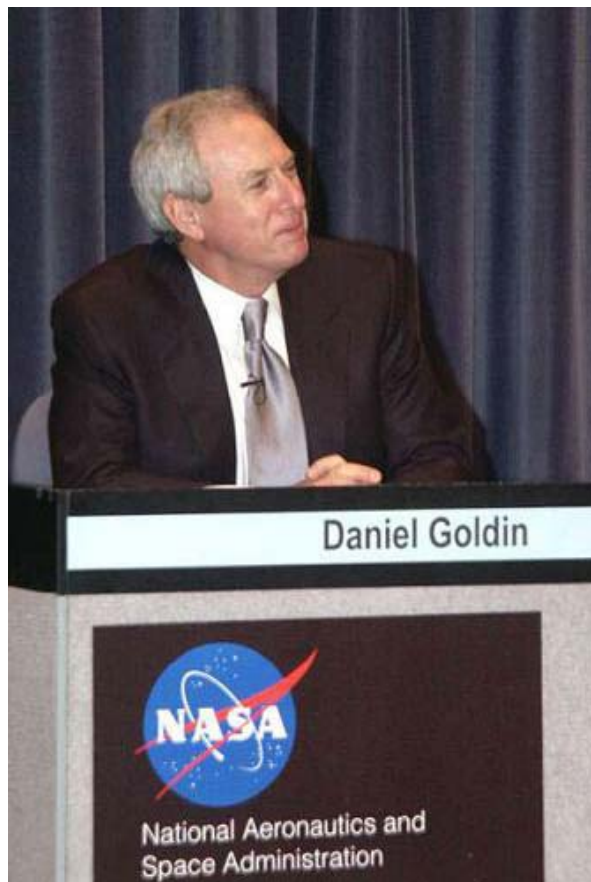


“There is a breaking-point at which it is no longer possible to continue, and ESA is very close to this point”

H. Habing  
(SSAC)



# Crisis in the United States (1994)



Faster, cheaper,  
better

# Cancel Cassini ?

"If a choice had to be made between AXAF and Cassini, international cooperation would be a secondary consideration, compared to the relative weight of the various pressure groups ...



The overall impression is one of total uncertainty ...

It would be very imprudent for ESA to depend too strongly on NASA for its long term future projects"

L. Woltjer (SSAC chair)

# Reactions in Europe



J.-M. Luton  
(ESA D.G.)

"Europe views any prospect of a unilateral withdrawal from cooperation on the part of the United States as totally unacceptable. Such an action would call into question the reliability of the U.S. as a partner in any future major scientific and technological cooperation"



Al Gore  
(US vice president)



# Reactions in Europe



H. Holbein (1533)  
The ambassadors



Bill  
Clinton

Go ahead !

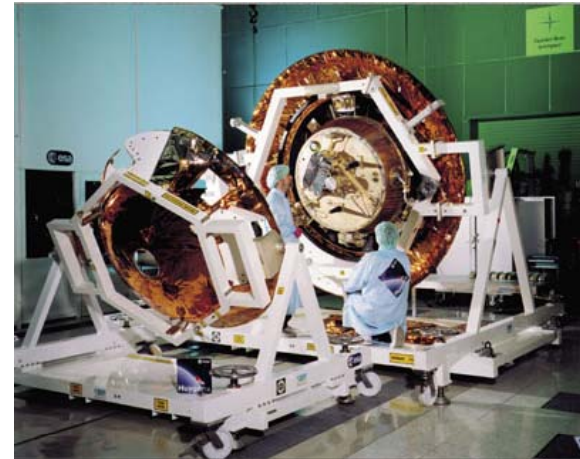
... but after an  
independent review  
by external experts

“... An unacceptable  
violation of the  
cooperative spirit”

R. Bonnet



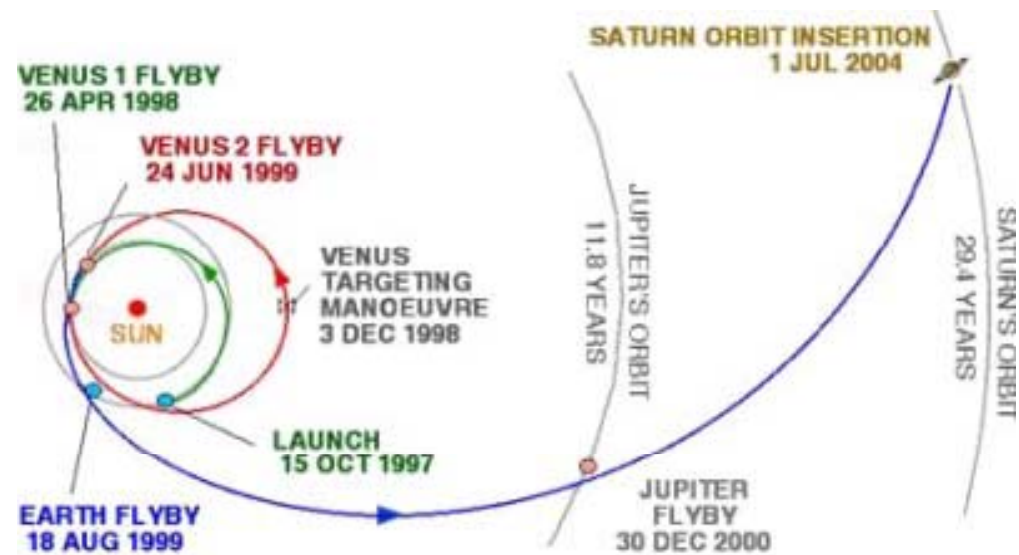
# Assembling



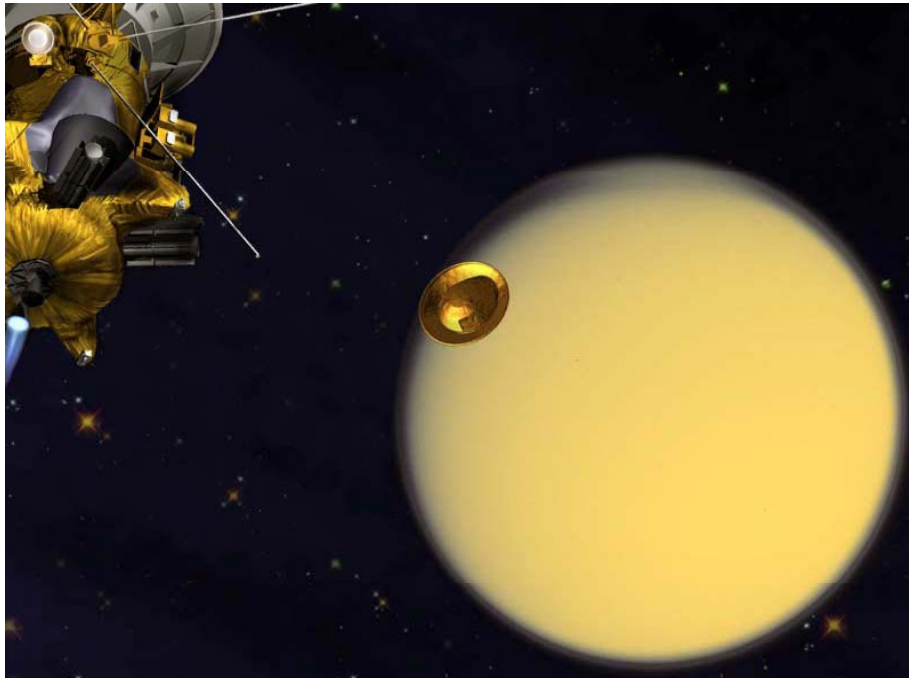




# Launch (15 october 1997)



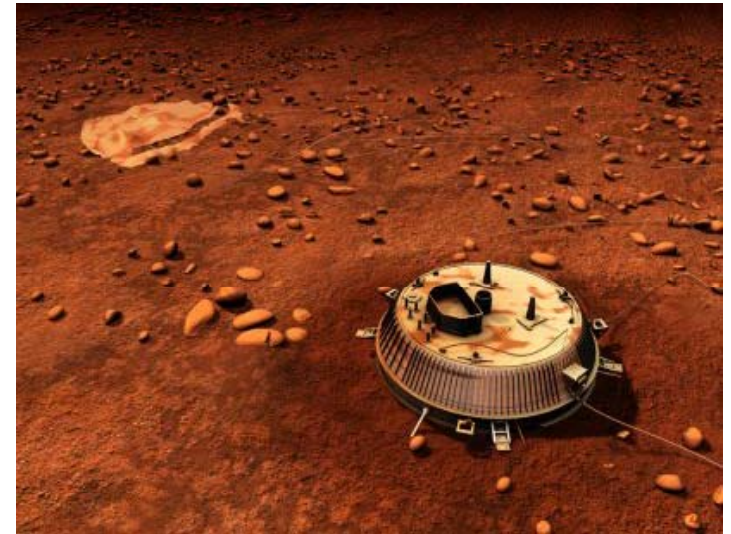
# Huygens release



24 december 2004



# Parachuting onto another world



14 January 2005

# A postcard from Titan

